EGIL

Circuit Breaker Analyzer

Programma®

EGIL

Circuit breaker analyzer

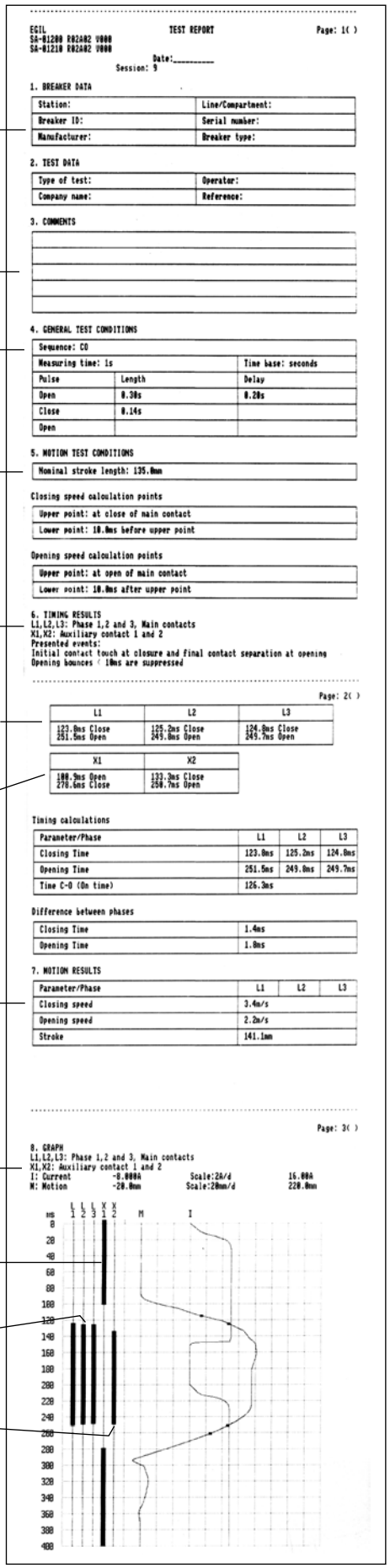
EGIL™, which incorporates benefits gained from experience with our larger instrument, is intended for circuit breakers with one contact per phase. Smaller and simpler, EGIL is equally versatile – and EGIL's price makes it attractive to small power plants. Moreover, it provides an ideal supplementary instrument for maintenance departments at large power companies.

EGIL is designed to test circuit breakers having one main contact per phase. Its three time channels are connected together on one side. Events at parallel contacts equipped with pre-insertion resistors are recorded and displayed simultaneously. There are two separate time channels for measurement of auxiliary contacts. To simplify on-site hookup, EGIL comes with ready-made multi-cable sets for both main and auxiliary contacts.

Coil currents are measured automatically and presented together with other readings immediately after testing on the display window or via the built-in printer. EGIL is easy to use – a built-in sequencer (program unit) sets the instrument automatically for the next sequential breaker operation.

Intended primarily for measuring travel (motion), the optional analog input channel finds many other uses as well. If this channel is not installed, all associated menu commands are hidden.

EGIL can also be equipped with an optional serial interface (RS-232C) for communication with a personal computer (PC) and the CABA Win* Circuit Breaker Analysis Software.



EGIL TEST REPORT Page: 1( )
SA-01200 R02A02 V000
SA-01210 R02A02 V000
Date:_____
Session: 9

1. BREAKER DATA

Station:	Line/Compartment:
Breaker ID:	Serial number:
Manufacturer:	Breaker type:

2. TEST DATA

Type of test:	Operator:
Company name:	Reference:

3. COMMENTS

4. GENERAL TEST CONDITIONS

Sequence: CO		
Measuring time: 1s		Time base: seconds
Pulse	Length	Delay
Open	0.30s	0.20s
Close	0.14s	
Open		

5. MOTION TEST CONDITIONS

Nominal stroke length: 135.0mm

Closing speed calculation points

Upper point: at close of main contact
Lower point: 10.0ms before upper point

Opening speed calculation points

Upper point: at open of main contact
Lower point: 10.0ms after upper point

6. TIMING RESULTS
L1,L2,L3: Phase 1,2 and 3, Main contacts
X1,X2: Auxiliary contact 1 and 2
Presented events:
Initial contact touch at closure and final contact separation at opening
Opening bounces < 10ms are suppressed

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L1	L2	L3
123.0ms Close 251.5ms Open	125.2ms Close 249.0ms Open	124.0ms Close 249.7ms Open

X1	X2
100.9ms Open 270.6ms Close	133.3ms Close 250.7ms Open

Timing calculations

Parameter/Phase	L1	L2	L3
Closing Time	123.0ms	125.2ms	124.0ms
Opening Time	251.5ms	249.0ms	249.7ms
Time C-O (On time)	126.3ms		

Difference between phases

Closing Time	1.4ms
Opening Time	1.0ms

7. MOTION RESULTS

Parameter/Phase	L1	L2	L3
Closing speed	3.4m/s		
Opening speed	2.2m/s		
Stroke	141.1mm		

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8. GRAPH
L1,L2,L3: Phase 1,2 and 3, Main contacts
X1,X2: Auxiliary contact 1 and 2
I: Current -8.000A Scale:2A/d 16.00A
M: Motion -20.0mm Scale:20mm/d 220.0mm

Space for your report data

Space for your comments

Parameters you have selected for breaker operation

Parameters you have selected for travel (motion) measurement

Filtering you have selected for time results

Tabular printout of time measurements at main contacts

Tabular printout of time measurements at auxiliary contacts

Tabular printout of travel (motion) calculations

Graphical printout

Auxiliary contact, close circuit

Main contacts

Auxiliary contact, trip circuit

Example of report printed out on the built-in printer. Close-Open operation. Time, coil currents and travel (motion) were measured. (Travel measurement is optional.) The above example is 55% of actual size.

Application

EGIL is intended primarily for testing high-voltage circuit breakers at medium-level voltages. There must not, however, be more than one breakpoint per phase since the time channels are not galvanically isolated. Contact times are recorded for main contacts, pre-insertion resistor contacts and auxiliary contacts. Coil currents are also recorded.

Besides the actual measurement values several parameters according to IEC standards are calculated and shown in the report, e.g. closing and opening time, difference between phases, overtravel, CO and OC time (and others).

Application example

IMPORTANT
Read the User's manual before using the instrument.

1. Ground EGIL using the included ground cable. Make certain that the circuit breaker is closed and grounded on both sides.
2. Connect the main contact cable set to EGIL and the circuit breaker.
3. Connect the auxiliary contact cable set to the a- and b-contacts on the operating mechanism.
4. Connect the EGIL sequencer to the close- and trip-coils and to the auxiliary voltage.
5. Remove the breaker's ground connection on one side.
6. You are now ready to proceed with the test. Simply turn the MEASURE rotary switch and read the results.

1. Built-in coil current measurement. Readings are presented on autoscaled graphs.
2. Sequencer for coil signals permits delays to be introduced for coil impulses that differ relative to each other.
3. Mains voltage changeover switch, 115/230 V AC.
4. Built-in printer features autoscaling, 114 mm (4,5") wide paper can be changed quickly and easily.
5. Galvanically isolated sockets ensure safe, reliable disconnection of operating coil cables before working in or on the breaker.
6. Three timing channels. Both main contacts and pre-insertion resistor contacts can be timed on the same channel. Results are presented both graphically and numerically.
7. Two galvanically isolated timing channels. Can be used for timing of dry or wet auxiliary contacts.
8. Optional analog input channel is intended for measuring travel (motion) or any other analog voltage.
9. Optional serial (RS-232C) interface for a computer (PC). Supports communication with the CABA breaker analysis software.
10. Menu-driven procedures automatically invoke default settings to eliminate time-consuming presetting. All menu lines associated with uninstalled optional equipment are hidden to enhance simplicity. For the basic egil unit you simply connect the multicable sets and turn the MEASURE knob.
11. AUX 1 & 2 buttons used for time channels that measure timing of auxiliary contacts. Contactsensing or voltage-sensing can be selected.
12. Switch used to start a preset sequence of breaker operations for which measurements are conducted simultaneously.
13. Designed and tested to meet the CE emission, immunity and electrical safety standards.
14. Breakerstate indicator. Egil measures the state (open or closed) of the breaker, whereupon the sequencer sets the instrument automatically for the next sequential operation.
15. Switch used to set the breaker to the desired state without activating the measurement channels.
16. Fast-select buttons for frequently used functions such as selecting a sequence of operations (C, O, C-O, O-C or O-C-O) and printing results.

Transducer cables GA-00041 and GA-00042

Multicable sets GA-00160 and GA-00170 and cable set GA-00082

Specifications EGIL

Specifications are valid at nominal input voltage and an ambient temperature of +25°C, (77°F). Specifications are subject to change without notice.

Environment	
Application field	The instrument is intended for use in medium-voltage substations and industrial environments up to 130 kV.
Temperature	
Operating	0°C to +50°C (32°F to +122°F)
Storage & transport	-40°C to +70°C (-40°F to +158°F)
Humidity	5% – 95% RH, non-condensing
CE-marking	
LVD	Low Voltage Directive 73/23/ EEC am. by 93/68/EEC
EMC	EMC Directive 89/336/EEC am. by 91/263/EEC, 92/31/EEC and 93/68/EEC
General	
Mains voltage	115/230 V AC (switchable), 50/60 Hz
Power consumption	100 VA (max)
Dimensions	
Instrument	360 x 210 x 190 mm (14.2" x 8.3" x 7.5")
Transport case	420 x 300 x 230 mm (16.5" x 11.8" x 9.0")
Weight	6.3 kg (14 lbs). 10 kg (22 lbs) with accessories and transport case
Display	LCD
Available languages	English, German, French, Spanish, Swedish
Measurement section	
Time measurement	
Measurement time	1 to 100 s
Resolution	0.1 to 10 ms
Number of channels	3 with common ground
Time base inaccuracy	0.05% of the reading ± resolution
Status thresholds	
Closed	< 10 Ω ±20%
Resistor	10 Ω ±20% to 3 kΩ ±20%
Open	> 3 kΩ ±20%
Open circuit voltage	24 V ±20%
Short circuit current	100 mA ±20%
AUX 1&2	
Number of channels	2, galvanically isolated
Contact-sensing (Dry)	
Status thresholds	
Closed	< 600 Ω ±30%
Open	> 600 Ω ±30%
Open circuit voltage	20 V ±20% DC
Short circuit current	25 mA ±20%
Voltage sensing (Wet)	
Status thresholds	
Open indication	< 8 V (*polarity insensitive)*
Close indication	> 13 V (*polarity insensitive)*
Working voltage	250 V AC/DC
Current measurement	
Range	±25 A per channel, sum of currents is measured
Resolution	25 mA
Inaccuracy	1% of the reading ±100 mA
Working voltage	250 V AC/DC
Breaker operation	
Sequences	C, O, C-O, O-C, O-C-O
Continuous current	5 A
Max current	25 A during 300 ms, rest time 1 min
Contact function	Two independent control functions
Contact characteristics	Non bouncing, closing time max. 0.1 ms
Make/Break capacity	25 A, 250 V (AC or DC) per contact function
Start breaker operation	By rotary switch
Pulse length	Adjustable in steps of 10 ms
Pulse delay	Adjustable in steps of 10 ms
Working voltage	250 V AC/DC
Motion (optional)	
Number of channels	1 independent
Max cable length	10 m (33 ft)
Input	
Range	-4 V to +4 V
Resolution	2 mV
Inaccuracy	1% of the measurement range
Transducer resistance	1 kΩ to 5 kΩ
Input impedance	150 kΩ
Output	
Open circuit voltage	4,092 V ±4 mV
Short circuit current	115 mA
Serial interface for PC (optional)	
Type	V24, RS232C
Format	8 bits, 1 stop bit, no parity
Speed	1200 - 19200 baud
Flow control	Xon/Xoff
Printout	
Type of printout	Graphic and numeric
Printer	Thermal printer with fixed print head
Graphic resolution	8 dots/mm – 203 dpi
Paper width	114 mm (4.5")

Ordering information

	Art.No.
EGIL	
Basic unit Complete with: Time measurement cables, GA-00160, GA-00170 Cable set for sequencer, GA-00082 Transport case, GD-00190	**BM-19090**
Egil with analog input channel and serial PC interface Complete with: Time measurement cables, GA-00160, GA-00170 Cable set for sequencer, GA-00082 Transducer cable XLR-open, 1 m (3.2 ft), GA-00041 Transducer cable XLR-XLR, 7.5 m (24.6 ft), GA-00042 Serial cable RS-232C Transport case, GD-00190	**BM-19093**
Upgrade From BM-19090 to BM-19093	**BM-90060**
Optional accessories	
See section "Circuit breaker testing accessories"	

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